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## WASTE MATERIAL AS A SOURCE OF PROFIT AND ADDED SECURITY ON TIMBER BONDS

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There are many woodenware articles which may be profitably manufactured from saw-mill waste, but the consideration of that portion of the problem belongs properly to the lumberman and is now receiving adequate attention at his hands. One company in Michigan is to-day producing a very superior grade of cattle food from their sawdust.

We will here discuss a more recent development of the industry, namely, the production of chemicals by the distillation of waste timber. Some of the articles produced are wood alcohol, turpentine, acetate of lime, acetate of soda, acetate of iron, tar, tar oil and charcoal. There is in addition to these a large number of finer products which may be obtained by a second distillation in refining plants, but such a heavy expenditure is needed to install the necessary apparatus for this second refining that it is not considered advisable in any but the very biggest operations, or where several plants in a district combine in order to get the largest possible profit from the chemical by-products.

The past history of lumber operations in America shows such shameful waste and wanton destruction of raw materials that the idea of utilizing this waste and converting it into a definite source of profit seems almost revolutionary. Yet no more remunerative field for investigation and experiment can be found in the whole timber industry and no branch of the business offers so wide a range for improvement as the utilization of waste material, and certainly there is none that will develop such sure and increasing profits.

The lumber market is subject to constant fluctuation, but most of the products obtained from the waste materials show a steady increase in both consumption and prices. Only one of these products, namely, turpentine, need be quoted at this time to prove the truth of this assertion. The trade quotations on turpentine f. o. b. Savannah, for the last week in April, show the following averages:

In 1908, 43.42 cents. In 1909, 36.83 cents. In 1910, 59.43 cents. In 1911, 74.25 cents.

As far back as 1905, the *Technical Quarterly*, speaking of this product, made the following statement:

"The life of the industry is limited to a few decades unless greater economy is practiced by the individual producer. Within the last three years the price of rosin has doubled, while the price of turpentine has steadily advanced. At the present rate of increase the next five years will see the prices of both double again."

On this item it is at once apparent that, with the rapid increase in consumption and the steady decrease in the standing timber capable of producing turpentine, there is no possible market condition that can so reduce the selling price as to make its manufacture unprofitable. The improvement in processes made during the past ten years has placed the turpentine business on such a stable basis that it is now proper to forecast it as a source of profit in all new operations and as an added security for the issuance of bonds on timber properties properly located and operated.

The familiar refuse burner in most operations may be regarded as a relic of a former state, so much so that it should be considered an evidence of improper equipment and a lack of progressive management. The "burning slab pile" as a cause of saw mill conflagration should be relegated to the tomb of primitive methods.

Within the compass of this brief article it would be difficult to lay down fixed rules on which to base an estimate of profits to be derived from the utilization of waste materials. Owing to the many different classes of timber and the varying market conditions, according to the location of the properties, we find that each operation presents distinctive problems. We will, therefore, confine ourselves to general terms and hope that this paper will lead to a more particular discussion of the topic.

Without going into cost comparisons of the methods of producing chemicals, we may say that there are three general systems: Distillation by steam, destructive distillation by the retort method, and destructive distillation by the kiln method.

The steam distillation process has been tried with varying success in different southern enterprises, and its exponents claim a uniformity of product with economical operation. In this operation the slabs are passed through chipping or grinding machines called

"hogs," and then conveyed into retorts fed with steam. In these retorts the turpentine and other volatile oils are extracted, after which the chips are converted into a superior quality of strawboard and packing papers.

The operation of destructive distillation plants is applicable to a much larger class of properties and should be given very careful consideration by every saw mill owner. Distillation not only affords an easy means of disposing of saw mill waste, but is a large profit producer. The time is rapidly approaching when, instead of being a side issue, the chemical product department will be the main business of many companies by which the production of lumber will be a minor factor.

This statement may seem incredible, but it is easily susceptible of proof. As an example, take a mill sawing seventy-five thousand feet of hardwood per day under fair conditions as to location and market. The owners consider a net profit of three dollars per thousand feet a very nice return, and one which would satisfy almost any timber operator. If the slabs from this mill are mixed with the tree tops and large limbs, it will be found that there will be an average daily output of seventy-five cords of chemical producing cordwood. With very ordinary economy in a chemical plant a net profit of ten dollars per cord may be obtained, or over three times the average net profit from the lumber department of the operation. For several years past the United States government reports show that the value of the chemicals produced exceed twenty dollars per cord of wood. These government figures are very conservative. The net profit to be derived is modified by the efficiency of the apparatus and the economies resulting from careful management.

Particular attention must be paid to the fact that the installation of a chemical plant will not interfere with saw mills as now operated. The sawdust and small refuse can still be used in the boiler plant for generation of steam. All our distillation estimates are based on the use of slabs and brush that are now absolutely lost to a great majority of timber operators.

Another element entering into the matter that is worthy of consideration is the possibility of minimizing the hazard from forest fires. Two operations in northern Michigan are fine examples of this point. Both properties are of the ordinary type of mixed timber, carrying on their lumbering operations winter and summer. When

any certain tract of timber is chosen for cutting, the start is made on one side and everything is cleared off the ground. The saw logs are shipped out to the mill. The tree tops, large limbs and small trees are cut into cordwood and piled along the logging railroad ready for shipment to the chemical plant as soon as properly seasoned. The brush is piled into heaps to be burned as soon as dry. This method of operating leaves the land cleared and effectively prevents forest fires coming in from other districts.

This system is one that should commend itself to any timber operator. If he uses high wheel trucks in his logging there is no obstacle to driving in every direction, and if he uses the cable haulage system in handling the logs, the conditions will be almost ideal. But this method of lumbering will appeal particularly to the buyer of timber bonds, as the security behind the bond issue is largely enhanced by totally eliminating the fire risk.

Where the waste timber is thus utilized there is a great advantage derived by the land being left cleared ready for the stump puller and settler. In the past the cutover lands have sold at from two to four dollars per acre. Under these newer methods the same lands find ready sale at from ten to twenty dollars per acre. In the operation of pine properties this latter point is very important, as it has been found that even the stumps are valuable. In fact, the stumps contain more turpentine than any other part of the tree. So that, where the operation receives its fullest and best development through utilizing the stumps in the distilling plant, the lands are left ready for the plow. Settlers in southern Michigan, who bought lands that were cut over twenty or thirty years ago, are selling the old pine stumps to the turpentine companies for enough to almost pay the cost of clearing their lands. In this same district some of the turpentine companies have bought large acres of cutover land, and after working up the old pine stumps in the distilleries at a handsome profit, are selling the land at largely increased prices.

The southern lumberman should be particularly interested in these newer and improved processes. After years of experiment it is now possible to manufacture in the modern wood distillation plant a grade of turpentine that is absolutely water white and free from all taint or odor of creosote. This can be done in one continuous operation and at the same time a very fine grade of gray acetate is made. If the plan is adopted in its entirety, it will be possible to

use the same machinery in pulling and loading the stumps that is now used in handling the logs alone. It will thus be possible for the lumberman to enter a virgin pine forest and clear it ready for the plow at one operation.

To sum up, we will catalogue the main points of advantage that arise in connection with modern wood distillation:

1. These processes, with slight modifications, are applicable to all classes of timber in any location.
2. The cost of installation ranges from one thousand to two thousand dollars per daily cord capacity, according to the class of timber used and the range of products required.
3. The average operation will produce one cord of wood for every thousand feet of lumber sawed.
4. As a distinct and separate business, with proper equipment, the chemical plant, after making liberal allowances for repairs and depreciation, will pay twenty per cent and upward on the capital invested.
5. A large reduction in fire hazard of both mill and timber lands.
6. Great increase in the value of cutover lands.
7. The large resulting increase in earning capacity of timber land improves the bondholder's security and facilitates the accumulation of increased sinking funds without hardship.

Even a very superficial examination of this subject will impress its importance upon any timber operator or purchaser of timber securities, as there is no one improvement in any other class of commercial activity that has taken such strides in the past decade.

Operating conditions vary so much in different districts that it is not possible to lay down any general rule by which to forecast the earnings, but no problem in wood distillation can be presented that cannot be solved by a competent expert. Certainly no new lumber enterprise of any magnitude should be organized without this feature of it receiving very careful consideration.